

PROGRAMMATIC BIOLOGICAL OPINION

for the

Bureau of Land Management

**Activities between June 5 and October 15, 2013 in
Undeveloped Areas of the National Petroleum Reserve-Alaska**

May 16, 2013

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1. INTRODUCTION

This document is the U.S. Fish and Wildlife Service's (Service) Biological Opinion (BO) on the Bureau of Land Management's (BLM) proposal to conduct or permit helicopter and fixed-wing (aircraft) landings, scientific studies and other on-tundra activities, including field camps in undeveloped areas of the National Petroleum Reserve-Alaska (NPR-A). This BO describes the effects of these actions on threatened spectacled (*Somateria fischeri*) and Steller's eiders (*Polysticta stelleri*), polar bears (*Ursus maritimus*), and proposed polar bear critical habitat pursuant to section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.).

BLM's memo requesting formal programmatic consultation and supplying the necessary information was received on April 15, 2013 and formal consultation began on this date. The complete administrative record of this consultation is on file at the Service's Fairbanks Fish and Wildlife Field Office.

BLM conducts and authorizes activities in NPR-A which have been previously described and evaluated in the BO for the Northern Planning Areas of the NPR-A (USFWS 2008). Scientific studies and their associated field camps, compliance visits, and extensive staking and surveying activities involving helicopter access and on-tundra activities in undeveloped areas of NPR-A were not evaluated in that BO.

This programmatic consultation and resulting BO is limited to:

- 1) Activities that result in disturbance only, not those related to any construction or demolition activities (including filling of wetlands);
- 2) Activities that do not require ESA Section 10 or Marine Mammal Management Act permits for research on listed species;
- 3) Activities north of 69.9° N but not within the Barrow triangle (defined as the area north of 69° 30' N, between Dease Inlet and the Chukchi Sea); and
- 4) Activities occurring between June 5 and October 15, 2013.

Section 7(a)(2) of the ESA states that federal agencies must ensure their activities are not likely to:

- Jeopardize the continued existence of any listed species; or
- Result in the destruction or adverse modification of designated critical habitat.

After reviewing the information provided, the status of the species, the environmental baseline, and cumulative effects, the Service concludes that the proposed activities may adversely affect listed eiders but will not jeopardize their continued existence. No adverse effects to polar bears or polar bear critical habitat are anticipated.

2. DESCRIPTION OF THE PROPOSED ACTION

Background

Section 7(a)(2) of the ESA, (16 U.S.C. § 1531 et seq.), requires that Federal agencies shall insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the

continued existence of any threatened or endangered species, or result in the destruction or adverse modification of critical habitat. When the actions of a Federal agency may adversely affect a protected species, that agency (i.e., the action agency) is required to consult with either the National Marine Fisheries Service (NMFS) or the Service, depending upon the protected species that may be affected. The timeframe for this project is June 5 through October 15.

For the actions described in this document, the action agency is the Bureau of Land Management (BLM). BLM will be conducting or authorizing activities described in this BO, which is the federal nexus for consultation. Due to the protected species involved, the Service is the consulting agency.

Action Area

The Action Area includes all BLM NPR-A managed land north of 69.9°N latitude excluding the Barrow “Triangle” area.

Proposed Action

The wide variety of studies and actions described below all involve people walking across isolated areas of undeveloped tundra in NPR-A. Access to and from the area will be via helicopter or fixed-wing plane. No facilities or structures will be built, and human presence is temporary.

Aircraft landings

Helicopters and small aircraft capable of landing on unimproved airstrips and gravel bars are the primary mode of transport during summer in undeveloped portions of NPR-A. They transport people and equipment in support of a variety of activities.

Anticipated aircraft activities:

- Fixed-wing landings during transportation of individuals and equipment in support of ground activities described below;
- Helicopter landings during transportation of individuals and equipment in support of ground activities described below that **are not** expected to create tracks of closely spaced landings in a linear manner over the landscape; and,
- Helicopter landings that **are** expected to create tracks of closely spaced landings in a linear manner over the landscape.

Ground activities

Ground activities are usually based out of field camp/fuel sites that are either previously developed (which include areas with gravel pads, landing strips, and structures) or undeveloped sites. Both categories may be used for ≥ 1 night as a camp site, and may be repeatedly visited by aircraft for refueling, moving field staff, or resupplying the field camp; however, the camp size, duration, and level of activity vary among camps.

Ground activities based out of field camps/fuel sites:

- Wildlife studies
- Fisheries studies
- Vegetation studies

- Lake water quality and quantity studies
- Stream hydrology and water quality studies
- Paleontological studies
- Archeological studies
- Hazardous materials/legacy well assessment
- Climatic/weather/soils studies
- Realty and oil/gas compliance work
- Clean up and inspection of winter exploration sites and access routes

Summary of expected aircraft landings:

During the period covered by this consultation BLM estimates:

- 1138 fixed-wing landings at approximately 320 unique sites during transportation of individuals and equipment in support of ground activities;
- 2689 helicopter landings at approximately 1150 unique sites during transportation of individuals and equipment in support of ground activities that **are not** expected to create “tracks” of closely spaced landings over a small area; and.
- 230 helicopter landings during transportation of individuals and equipment in support of ground activities that **are** expected to create **2 “tracks”** of closely spaced landings over a small area with 120 unique sites disturbed.

A list of projects and estimated number of landings are in a table in the project record for this consultation at both the BLM and USFWS field offices in Fairbanks, Alaska.

Polar bear minimization measures

In order to prevent impacts to polar bears, BLM will require permittees operating in NPR-A within 25 miles of the coast to follow guidelines developed in cooperation with the Service’s Marine Mammals Management Office. Implementation of these guidelines should minimize the risk of human - polar bear interaction, and provided they are followed, no adverse effects to polar bears are anticipated to result from activities authorized by this Programmatic BO. The guidelines are provided in Appendix 1.

3. STATUS OF THE SPECIES AND CRITICAL HABITAT

This section presents biological and ecological information relevant to the BO. Appropriate information on species’ life history, habitat and distribution, and other factors necessary for their survival is included for analysis in later sections.

Spectacled eider

Spectacled eiders (Figure 3.1A) were listed as threatened throughout their range on May 10, 1993 (USFWS 1993) based on indications of steep declines in the two Alaska-breeding populations. There are three primary spectacled eider populations, corresponding to breeding grounds on Alaska’s North Slope, the Yukon–Kuskokwim Delta (YK-delta), and northern Russia. The YK-delta population declined 96% between the early 1970s and 1992 (Stehn et al. 1993). Data from the Prudhoe Bay oil fields (Warnock and Troy 1992) and information from Native elders at Wainwright, Alaska (R. Suydam, pers. comm. in USFWS 1996) suggested

concurrent localized declines on the North Slope, although data for the entire North Slope breeding population were not available. Spectacled eiders molt in several discrete areas (Figure 3.1B) during late summer and fall, with birds from the different populations and genders apparently favoring different molting areas (Petersen et al. 1999). All three spectacled eider populations overwinter in openings in pack ice of the central Bering Sea, south of St. Lawrence Island (Petersen et al. 1999; Figure 3.2), where they remain until March–April (Lovvorn et al. 2003).

Life History

Breeding – In Alaska, spectacled eiders breed primarily on the North Slope (ACP) and the YK-delta. On the ACP, spectacled eiders breed north of a line connecting the mouth of the Utukok River to a point on the Shaviovik River about 24 km (15 mi) inland from its mouth. Breeding density varies across the ACP (Figure 3.2). Although spectacled eiders historically occurred throughout the coastal zone of the YK-delta, they currently breed primarily in the central coast zone within about 15 km (9 mi) of the coast from Kigigak Island north to Kokechik Bay (USFWS 1996). However, sightings on the YK-delta have also occurred both north and south of this area during the breeding season (R. Platte, USFWS, pers. comm. 1997).

Spectacled eiders arrive on the ACP breeding grounds in late May to early June. Numbers of breeding pairs peak in mid-June and decline 4–5 days later when males begin to depart from the breeding grounds (Smith et al. 1994, Anderson and Cooper 1994, Anderson et al. 1995, Bart and Earnst 2005). Mean clutch size reported from studies on the Colville River Delta was 4.3 (Bart and Earnst 2005). Spectacled eider clutch size near Barrow has averaged 3.2–4.1, with clutches of up to eight eggs reported (Quakenbush et al. 1995, Safine 2011). Incubation lasts 20–25 days (Kondratyev and Zadorina 1992, Harwood and Moran 1993, Moran and Harwood 1994, Moran 1995), and hatching occurs from mid- to late July (Warnock and Troy 1992).

Nest initiation on Kigigak Island on the YK-delta occurs from mid-May to mid-June (Lake 2007). Incubation lasts approximately 24 days (Dau 1974). Mean spectacled eider clutch size is higher on the YK-delta compared to the ACP. Mean annual clutch size ranged from 3.8–5.4 in coastal areas of the YK-delta (1985–2011; Fischer et al. 2011), and 4.0–5.5 on Kigigak Island (1992–2011; Gabrielson and Graff 2011), with clutches of up to eight eggs reported (Lake 2007).

On the breeding grounds, spectacled eiders feed on mollusks, insect larvae (crane flies, caddisflies, and midges), small freshwater crustaceans, and plants and seeds (Kondratyev and Zadorina 1992) in shallow freshwater or brackish ponds, or on flooded tundra. Ducklings fledge approximately 50 days after hatch, when females with broods move from freshwater to marine habitat prior to fall migration.

Survivorship – Nest success is highly variable and thought to be primarily influenced by predators, including gulls (*Larus* spp.), jaegers (*Stercorarius* spp.), and red (*Vulpes vulpes*) and arctic (*Alopex lagopus*) foxes. In arctic Russia, apparent nest success was estimated to be <2% in 1994 and 27% in 1995; low nest success was attributed to predation (Pearce et al. 1998). Apparent nest success in 1991 and 1993–1995 in the Kuparuk and Prudhoe Bay oil fields on the ACP was also low, varying from 25–40% (Warnock and Troy 1992, Anderson et al. 1998). On Kigigak Island in the YK-delta, nest survival probability ranged from 0.06–0.92 from 1992–2007

(Lake 2007); nest success tended to be higher in years with low fox numbers or activity (i.e., no denning) or when foxes were eliminated from the island prior to the nesting season. Bowman et al. (2002) also reported high variation in nesting success (20–95%) of spectacled eiders on the YK-delta, depending on year and location.

(A)



(B)



Figure 3.1. (A) Male and female spectacled eiders in breeding plumage. (B) Distribution of spectacled eiders. Molting areas (green) are used July –October. Wintering areas (yellow) are used October –April. The full extent of molting and wintering areas is not yet known and may extend beyond the boundaries shown.

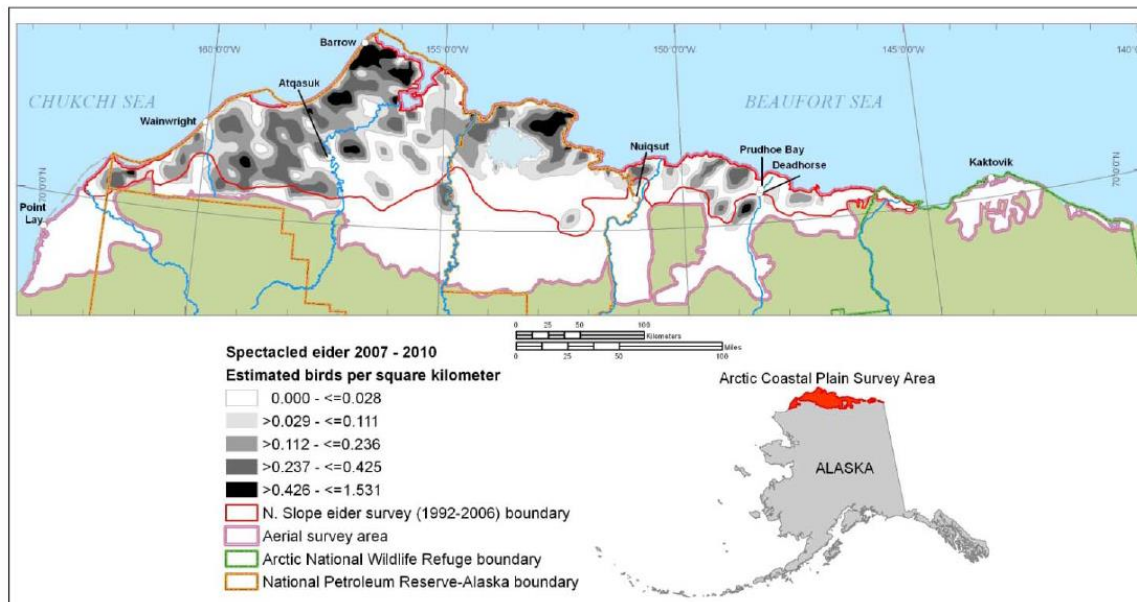


Figure 3.2. Density distribution of spectacled eiders observed on aerial transects sampling 57,336 km² of wetland tundra on the North Slope of Alaska during early to mid-June, 2007–2010 (Larned et al. 2011).

Available data indicate egg hatchability is high for spectacled eiders nesting on the ACP, in arctic Russia, and at inland sites on the YK-delta, but considerably lower in the coastal region of the YK-delta. Spectacled eider eggs that are addled or that do not hatch are very rare in the Prudhoe Bay area (Declan Troy, TERA, pers. comm. 1997), and Esler et al. (1995) found very few addled eggs on the Indigirka River Delta in Arctic Russia. Additionally, from 1969 to 1973 at an inland site on the Yukon Delta National Wildlife Refuge, only 0.8% of spectacled eider eggs were addled or infertile (Dau 1974). In contrast, 24% of all nests monitored in a coastal region of the YK-delta during the early to mid-1990s contained inviable eggs and ~10% of eggs in successful nests did not hatch due to either embryonic mortality or infertility (Grand and Flint 1997). This relatively high occurrence of inviable eggs near the coast of the YK-delta may have been related to exposure to contaminants (Grand and Flint 1997). It is unknown whether hatchability of eggs in this region has improved with decreased use of lead shot in the region and natural attenuation of existing lead pellets (Flint and Schamber 2010) in coastal YK-delta wetlands.

Recruitment rate (the percentage of young eiders that hatch, fledge, and survive to sexual-maturity) of spectacled eiders is poorly known (USFWS 1999) because there is limited data on juvenile survival. In a coastal region of the YK-delta, duckling survival to 30 days averaged 34%, with 74% of this mortality occurring in the first 10 days, while survival of adult females during the first 30 days post hatch was 93% (Flint and Grand 1997).

Fall migration and molting – As with many other sea ducks, spectacled eiders spend the 8–10 month non-breeding season at sea, but until recently much about the species' life history in the

marine environment was unknown. Satellite telemetry and aerial surveys led to the discovery of spectacled eider migrating, molting, and wintering areas. These studies are summarized in Petersen et al. (1995), Larned et al. (1995), and Petersen et al. (1999). Results of recent satellite telemetry research (2008–2011) are consistent with earlier studies (Matt Sexson, USGS, pers. comm.). Phenology, spring migration and breeding, including arrival, nest initiation, hatch, and fledging, is 3–4 weeks earlier in western Alaska (YK-delta) than northern Alaska (ACP); however, phenology of fall migration is similar between areas. Individuals depart breeding areas July–September, depending on their breeding status, and molt in September–October (Matt Sexson, USGS, pers. comm.).

Males generally depart breeding areas on the ACP when the females begin incubation in late June (Anderson and Cooper 1994, Bart and Earnst 2005). Use of the Beaufort Sea by departing males is variable. Some appear to move directly to the Chukchi Sea over land, while the majority move rapidly (average travel of 1.75 days), over near shore waters from breeding grounds to the Chukchi Sea (TERA 2002). Of 14 males implanted with satellite transmitters, only four spent an extended period of time (11–30 days), in the Beaufort Sea (TERA 2002). Preferred areas for males appeared to be near large river deltas such as the Colville River where open water is more prevalent in early summer when much of the Beaufort Sea is still frozen. Most adult males marked with satellite transmitters in northern and western Alaska in a recent satellite telemetry study migrated to northern Russia to molt (USGS, unpublished data). Results from this study also suggest that male eiders likely follow coast lines but also migrate straight across the northern Bering and Chukchi seas en route to northern Russia (Matt Sexson, USGS, pers. comm.).

Females generally depart the breeding grounds later, when much more of the Beaufort Sea is ice-free, allowing more extensive use of the area. Females spent an average of two weeks in the Beaufort Sea (range 6–30 days) with the western Beaufort Sea the most heavily used (TERA 2002). Females also appeared to migrate through the Beaufort Sea an average of 10 km further offshore than males (Petersen et al. 1999). The greater use of the Beaufort Sea and offshore areas by females was attributed to the greater availability of open water when females depart the area (Petersen et al. 1999, TERA 2002). Recent telemetry data indicates that molt migration of failed/non-breeding females from the Colville River Delta through the Beaufort Sea is relatively rapid, 2–weeks, compared to 2–3 months spent in the Chukchi Sea (Matt Sexson, USGS, pers. comm.).

Spectacled eiders use specific molting areas from July to late October/early November. Larned et al. (1995) and Petersen et al. (1999) discussed spectacled eiders' apparent strong preference for specific molting locations, and concluded that all spectacled eiders molt in four discrete areas (Table 3.1). Females generally used molting areas nearest their breeding grounds. All marked females from the YK-delta molted in nearby Norton Sound, while females from the North Slope molted in Ledyard Bay, along the Russian coast, and near St. Lawrence Island. Males did not show strong molting site fidelity; males from all three breeding areas molted in Ledyard Bay, Mechigmentskiy Bay, and the Indigirka/Kolyma River Delta. Males reached molting areas first, beginning in late June, and remained through mid-October. Non-breeding females, and those that nested but failed, arrived at molting areas in late July, while successfully-breeding females and young of the year reached molting areas in late August through late September and remained

through October. Fledged juveniles marked on the Colville River Delta usually staged in the Beaufort Sea near the delta for 2–3 weeks before migrating to the Chukchi Sea.

Table 3.1 Important staging and molting areas for female and male spectacled eiders from each breeding population.

Population and Sex	Known Major Staging/Molting Areas
Arctic Russia Males	Northwest of Medvezhni (Bear) Island group
	Mechigmentskiy Bay
	Ledyard Bay
Arctic Russia Females	unknown
North Slope Males	Ledyard Bay
	Northwest of Medvezhni (Bear) Island group
	Mechigmentskiy Bay
North Slope Females	Ledyard Bay
	Mechigmentskiy Bay
	West of St. Lawrence Island
YK-delta Males	Mechigmentskiy Bay
	Northeastern Norton Sound
YK-delta Females	Northeastern Norton Sound

Avian molt is energetically demanding, especially for species such as spectacled eiders that complete molt in a few weeks. Molting birds must have ample food resources, and the rich benthic community of Ledyard Bay (Feder et al. 1989, 1994a, 1994b) likely provides these for spectacled eiders. Large concentrations of spectacled eiders molt in Ledyard Bay to use this food resource; aerial surveys on 4 days in different years counted 200 to 33,192 molting spectacled eiders in Ledyard Bay (Petersen et al. 1999; Larned et al. 1995).

Wintering – Spectacled eiders generally depart all molting sites in late October/early November (Matt Sexson, USGS, pers. comm.), migrating offshore in the Chukchi and Bering seas to a single wintering area in openings in pack ice of the central Bering Sea south/southwest of St. Lawrence Island (Figure 3.1). In this relatively shallow area, > 300,000 spectacled eiders (Petersen et al. 1999) rest and feed, diving up to 230 ft (70 m) to eat bivalves, other mollusks, and crustaceans (Cottam 1939, Petersen et al. 1998, Lovvorn et al. 2003, Petersen and Douglas 2004).

Spring migration – Recent information indicates spectacled eiders likely make extensive use of the eastern Chukchi spring lead system between departure from the wintering area in March and April and arrival on the North Slope in mid-May or early June. Limited spring observations in the eastern Chukchi Sea have documented dozens to several hundred common eiders (*Somateria mollissima*) and spectacled eiders in spring leads and several miles offshore in relatively small openings in rotting sea ice (W. Larned, USFWS; J. Lovvorn, University of Wyoming, pers. comm.). Woodby and Divoky (1982) documented large numbers of king (*Somateria spectabilis*) and common eiders using the eastern Chukchi lead system, advancing in pulses during days of favorable following winds, and concluded that an open lead is probably requisite for spring eider passage in this region. Preliminary results from an ongoing satellite telemetry study conducted

by the USGS Alaska Science Center (Figure 3.3; USGS, unpublished data) suggest that spectacled eiders also use the lead system during spring migration.

Adequate foraging opportunities and nutrition during spring migration are critical to spectacled eider productivity. Like most sea ducks, female spectacled eiders do not feed substantially on the breeding grounds, but produce and incubate eggs while living primarily off body reserves (Korschgen 1977, Drent and Daan 1980, Parker and Holm 1990). Clutch size, a measure of reproductive potential, was positively correlated with body condition and reserves obtained prior to arrival at breeding areas (Coulson 1984, Raveling 1979, Parker and Holm 1990). Body reserves must be maintained from winter or acquired during the 4-8 weeks (Lovvorn et al. 2003) of spring staging, and Petersen and Flint (2002) suggest common eider productivity on the western Beaufort Sea coast is influenced by conditions encountered in May to early June during migration through the Chukchi Sea (including Ledyard Bay). Common eider female body mass increased 20% during the 4-6 weeks prior to egg laying (Gorman and Milne 1971, Milne 1976, Korschgen 1977, Parker and Holm 1990). For spectacled eiders, average female body weight in late March in the Bering Sea was $1,550 \pm 35$ g ($n = 12$), and slightly (but not significantly) more upon arrival at breeding sites ($1,623 \pm 46$ g, $n = 11$; Lovvorn et al. 2003), suggesting that spectacled eiders maintain or enhance their physiological condition during spring staging.

Abundance and trends

The most recent rangewide estimate of abundance of spectacled eiders was 369,122 (364,190–374,054 90% CI), obtained by aerial surveys of the known wintering area in the Bering Sea in late winter 2010 (Larned et al. 2012a). Comparison of point estimates between 1997 and 2010 indicate an average of 353,051 spectacled eiders (344,147-361,956 90% CI) in the global population over that 14-year period (Larned et al. 2012a).

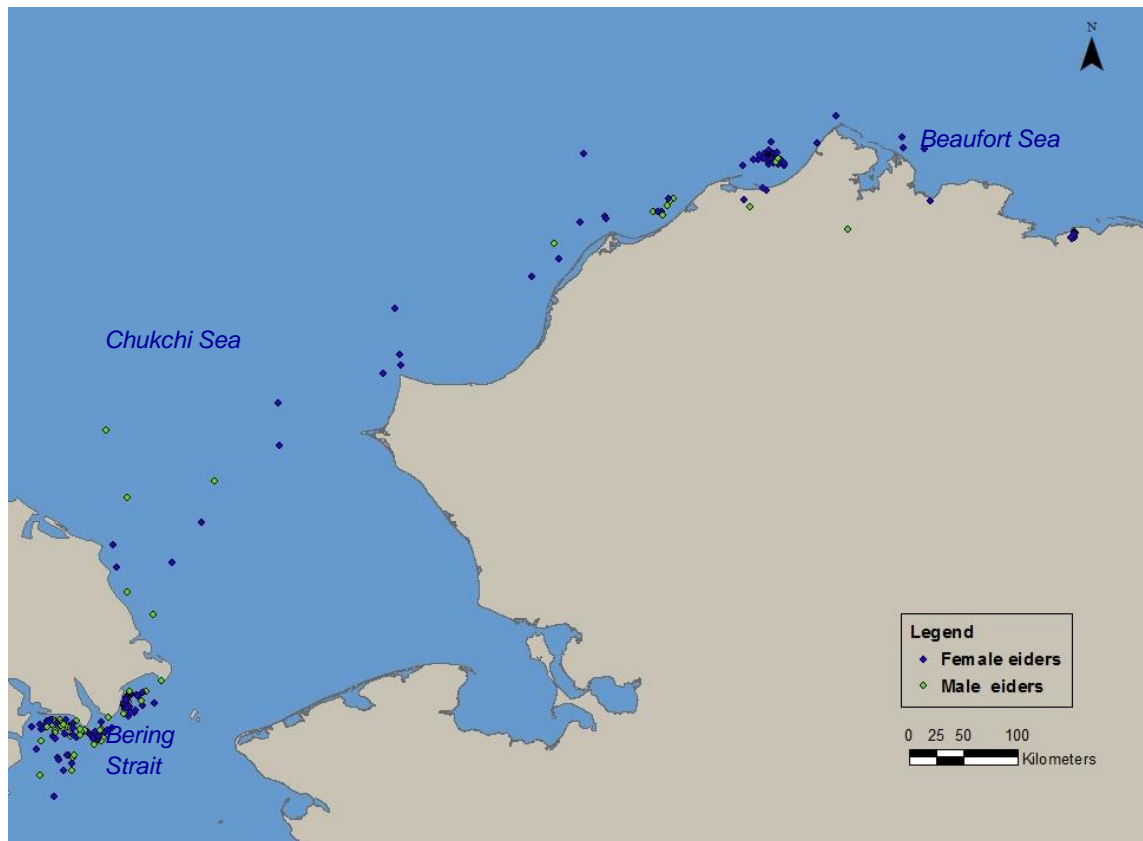


Figure 3.3. Spectacled eider satellite telemetry locations for 12 female and 7 male spectacled eiders in the eastern Chukchi Sea from 1 April – 15 June 2010 and 1 April – 15 June 2011. Additional locations from the northern coast of Russia are not shown. Eiders were tagged on the North Slope during the 2009 and 2010 breeding seasons. Data provided by Matt Sexson, USGS Alaska Science Center (USGS, unpublished).

Population indices for North Slope-breeding spectacled eiders are unavailable prior to 1992. However, Warnock and Troy (1992) documented an 80% decline in spectacled eider abundance from 1981 to 1991 in the Prudhoe Bay area. Since 1992, the Service has conducted annual aerial surveys for breeding spectacled eiders on the ACP. The 2010 population index based on these aerial surveys was 6,286 birds (95% CI, 4,877–7,695; unadjusted for detection probability), which is 4% lower than the 18-year mean (Larned et al 2011). In 2010, the index growth rate was significantly negative for both the long-term (0.987; 95% CI, 0.974–0.999) and most recent 10 years (0.974; 95% CI, 0.950–0.999; Larned et al. 2011). Stehn et al. (2006) developed a North Slope-breeding population estimate of 12,916 (95% CI, 10,942–14,890) based on the 2002–2006 ACP aerial index for spectacled eiders and relationships between ground and aerial surveys on the YK-delta. If the same methods are applied to the 2007–2010 ACP aerial index reported in Larned et al. (2011), the resulting adjusted population estimate for North Slope-breeding spectacled eiders is 11,254 (8,338–14,167, 95% CI).

The YK-delta spectacled eider population was thought to be about 4% of historical levels in 1992 (Stehn et al. 1993). Evidence of the dramatic decline in spectacled eider nesting on the

YK-delta was corroborated by Ely et al. (1994). They documented a 79% decline in eider nesting between 1969 and 1992 for areas near the Kashunuk River. Aerial and ground survey data indicated that spectacled eiders were undergoing a decline of 9–14% per year from 1985–1992 (Stehn et al. 1993). Further, from the early 1970s to the early 1990s, the number of pairs on the YK-delta declined from 48,000 to 2,000, apparently stabilizing at that low level (Stehn et al. 1993). Before 1972, an estimated 47,700–70,000 pairs of spectacled eiders nested on the YK-delta in average to good years (Dau and Kistchinski 1977).

Fischer et al. (2011) used combined annual ground-based and aerial survey data to estimate the number of nests and eggs of spectacled eiders on the coastal area of the YK-delta in 2011 and evaluate long-term trends in the YK-delta breeding population from 1985 to 2011. In a given year, the estimated number of nests reflects the minimum number of breeding pairs in the population and does not include non-nesting breeders or nests that were destroyed or abandoned (Fischer et al. 2011). The total number of nests in 2011 was estimated at 3,608 (SE 448) spectacled eiders nests on the YK-delta, the second lowest estimate over the past 10 years. The average population growth rate based on these surveys was 1.049 (90% CI = 0.994–1.105) in 2002–2011 and 1.003 (90% CI = 0.991–1.015) in 1985–2011 (Fischer et al. 2011). Log-linear regression based solely on the long-term YK-delta aerial survey data indicate positive population growth rates of 1.073 (90% CI = 1.046–1.100) in 2001–2010 and 1.070 (90% CI = 1.058–1.081) in 1988–2010 (Platte and Stehn 2011).

Spectacled eider recovery criteria

The Spectacled Eider Recovery Plan (USFWS 1996) presents research and management priorities with the objective of recovery and delisting so that protection under the ESA is no longer required. Although the cause or causes of the spectacled eider population decline is not known, factors that affect adult survival are likely to be the most influential on population growth rate. These include lead poisoning from ingested spent shotgun pellets, which may have contributed to the rapid decline observed in the YK-delta (Franson et al. 1995, Grand et al. 1998), and other factors such as habitat loss, increased nest predation, over harvest, and disturbance and collisions caused by human infrastructure. Under the Recovery Plan, the species will be considered recovered when each of the three recognized populations (YK-delta, North Slope of Alaska, and Arctic Russia): 1) is stable or increasing over 10 or more years and the minimum estimated population size is at least 6,000 breeding pairs, or 2) number at least 10,000 breeding pairs over 3 or more years, or 3) number at least 25,000 breeding pairs in one year. Spectacled eiders do not currently meet these recovery criteria.

Steller's eider

Status and Distribution

Steller's eiders are divided into Atlantic and Pacific populations; the Pacific population is further divided into the Russia-breeding population, which nests along the Russian eastern arctic coastal plain, and the Alaska-breeding population. The Alaska breeding population of the Steller's eider was listed as threatened on July 11, 1997 based on substantial contraction of the species' breeding range on the Arctic Coastal Plain (ACP) and on the Y-K Delta in Alaska, reduced numbers of Steller's eiders breeding in Alaska, and the resulting vulnerability of the remaining breeding population to extirpation (62 FR 31748). In Alaska, Steller's eiders breed almost exclusively on the Arctic Coastal Plain (ACP) and molt and winter, along with the majority of

the Russia-breeding population, in southcentral Alaska (Figure 3.4). Periodic non-breeding of the entire population of Steller's eiders breeding near Barrow, AK, the species' primary breeding grounds, coupled with low nesting and fledging success, has resulted in very low productivity (Quakenbush et al. 2004) and may make the population particularly vulnerable to extirpation. In 2001, the Service designated 2,830 mi² (7,330 km²) of critical habitat for the Alaska-breeding population of Steller's eiders at historic breeding areas on the Y-K Delta, a molting and staging area in the Kuskokwim Shoals, and molting areas in marine waters at Seal Islands, Nelson Lagoon, and Izembek Lagoon (66 FR 8850). No critical habitat for Steller's eiders has been designated on the ACP.

The best available estimate of North Slope breeding Steller's eiders is 576 birds (Stehn and Platte 2009); however, as mentioned previously obtaining a reliable population estimate is difficult for this species. Following assessment of potential biases inherent in the two USFWS surveys, Stehn and Platte (2009) identified a subset of the North Slope Eider (NSE) survey data (1993–2008) that they determined was “least confounded by changes in survey timing and observers.” Based on this subset, the average population index for Steller's eiders was 173 (90% CI 88–258) with an estimated population growth rate of 1.011 (90% CI 0.857–1.193). The average population size of Steller's eiders breeding in the ACP was estimated at 576 (90% CI 292–859; Stehn and Platte 2009) assuming a detection probability of 30%. Currently, this analysis provides the best available estimate of the Alaska-breeding Steller's eider population size and growth rate from the ACP. Note that these estimates are based on relatively few observations of Steller's eiders each year with none seen in many survey years.

Steller's eiders generally occur in low densities throughout the ACP (Figure 3.5), but their density increases south to north, with the highest density occurring near Barrow (Obritschkewitsch and Ritchie 2012, Larned et al. 2012b). To illustrate, their estimated density in the Barrow area was 0.0307 total birds/km² (Figure 3.6; Obritschkewitsch and Ritchie 2012), while their density estimate in the larger, more inclusive ACP north coastal area (Figure 3.5) was 0.0047 indicated total bird/km² (calculated using in Figure 22 of Larned et al. 2012b). This suggests the Steller's eider density near Barrow may be approximately 6.5 times higher near Barrow than that in the north coastal area of the ACP.

Life History

North Slope Breeding—Steller's eiders arrive in pairs on the ACP in early June, but nests have been found near Barrow in only 64% of the years since 1991 (14 of 22 years; USFWS, unpublished data). Non-breeding has been observed in long-lived eider species and is typically related to inadequate body condition (Coulson 1984), but reasons for Steller's eiders variable nesting effort may be more complex. Periodic non-breeding by Steller's eiders near Barrow seems to be associated with fluctuations in lemming populations and related breeding patterns in pomarine jaegers (*Stercorarius pomarinus*) and snowy owls (*Nyctea scandiaca*) (Quakenbush et al. 2004). In years with high lemming abundance, Quakenbush et al. (2004) reported that Steller's eider nesting success was a function of a nest's distance from pomarine jaeger and snowy owl nests. These avian predators nest only in years of high lemming abundance and defend their nests aggressively against arctic foxes. By nesting within jaeger and owl territories, Steller's eiders may benefit from protection against arctic foxes even at the expense of occasional partial nest depredation by the avian predators themselves (Quakenbush et al. 2002, Quakenbush et al. 2004). Steller's eiders may also benefit from the increased availability of

alternative prey for both arctic foxes and avian predators in high lemming years (Quakenbush et al. 2004).

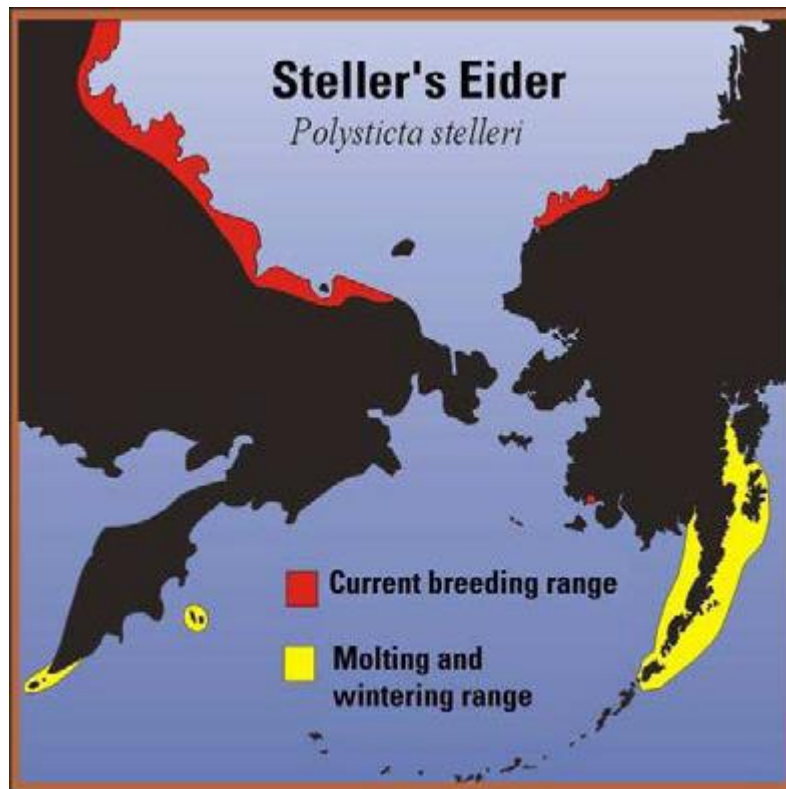


Figure 3.4. Steller's eider distribution in the Bering, Beaufort and Chukchi seas.

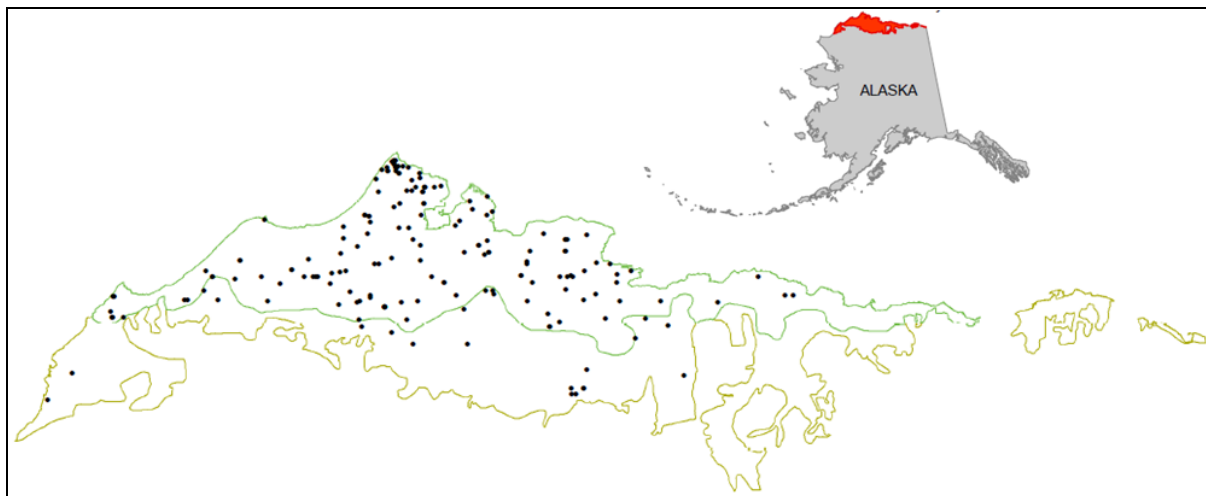


Figure 3.5. All sightings from the Arctic Coastal Plain (ACP) survey (1989–2008) and the North Slope eider (NSE) survey (1992–2006). The ACP survey encompasses the entire area shown (61,645 km²); the NSE includes only the northern portion outlined in green (30,465 km²). Modified from Stehn and Platte 2009.

When they do nest, Alaska-breeding Steller's eiders use coastal tundra adjacent to small ponds or within drained lake basins, occasionally as far as 90 km inland. Nests are initiated in the first half of June (Quakenbush et al. 2004). Mean clutch size near Barrow was 5.4 ± 1.6 (range = 1-8) in 1991-1999 (Quakenbush et al. 2004). In years with fox control near Barrow, clutch size averaged ranged from 5.8 to 6.6 eggs (2006-2011; Rojek 2007, Rojek 2008, Safine 2011, and Safine 2012).

As with spectacled eiders, nest and egg loss was attributed partially to predation by jaegers, common raven (*Corvus corax*), arctic fox, and possibly glaucous gulls (*Larus hyperboreus*; Quakenbush et al. 1995, Obritschkewitsch et al. 2001). During 2008-2011, nest cameras near Barrow documented partial and complete nest predation of sea duck nests, including those of Steller's eiders, by pomarine and parasitic jaegers, arctic fox, glaucous gulls, and polar bears (Safine 2011, Safine 2012).

Predator population levels likely influence the probability that females will be able to hatch at least one egg (termed "mean nest survival") across the landscape. Near Barrow, mean nest survival was $0.23 (\pm 0.09 \text{ SE})$ from 1991–2004, before implementation of fox control. During breeding seasons with fox control (2008-2012), mean nest survival was $0.47 (\pm 0.08 \text{ SE})$ (USFWS, unpublished data). Thus, predator control may be a useful tool in reducing egg loss of Steller's eiders.

Hatching occurs from mid-July through early August (Rojek 2006, 2007, and 2008). Within about one day after hatch, hens move their broods to adjacent ponds with emergent vegetation, particularly *Carex aquatilis* and *Arctophila fulva* (Rojek 2006, Rojek 2007, Safine 2011, Safine 2012). Here, they feed on insect larvae and other wetland invertebrates. Broods may move up to several kilometers from the nest prior to fledging (Rojek 2006). Fledging occurs from 32-37 days post hatch (Obritschkewitsch et al. 2001, Rojek 2006).

Limited information from intra-year recapture of females suggests Steller's eiders may exhibit breeding site fidelity in the Barrow area, their primary breeding location in Alaska (USFWS, unpublished data, September 2012). Breeding site fidelity could limit nesting effort in other suitable habitat by displaced females, which in turn could decrease breeding effort.

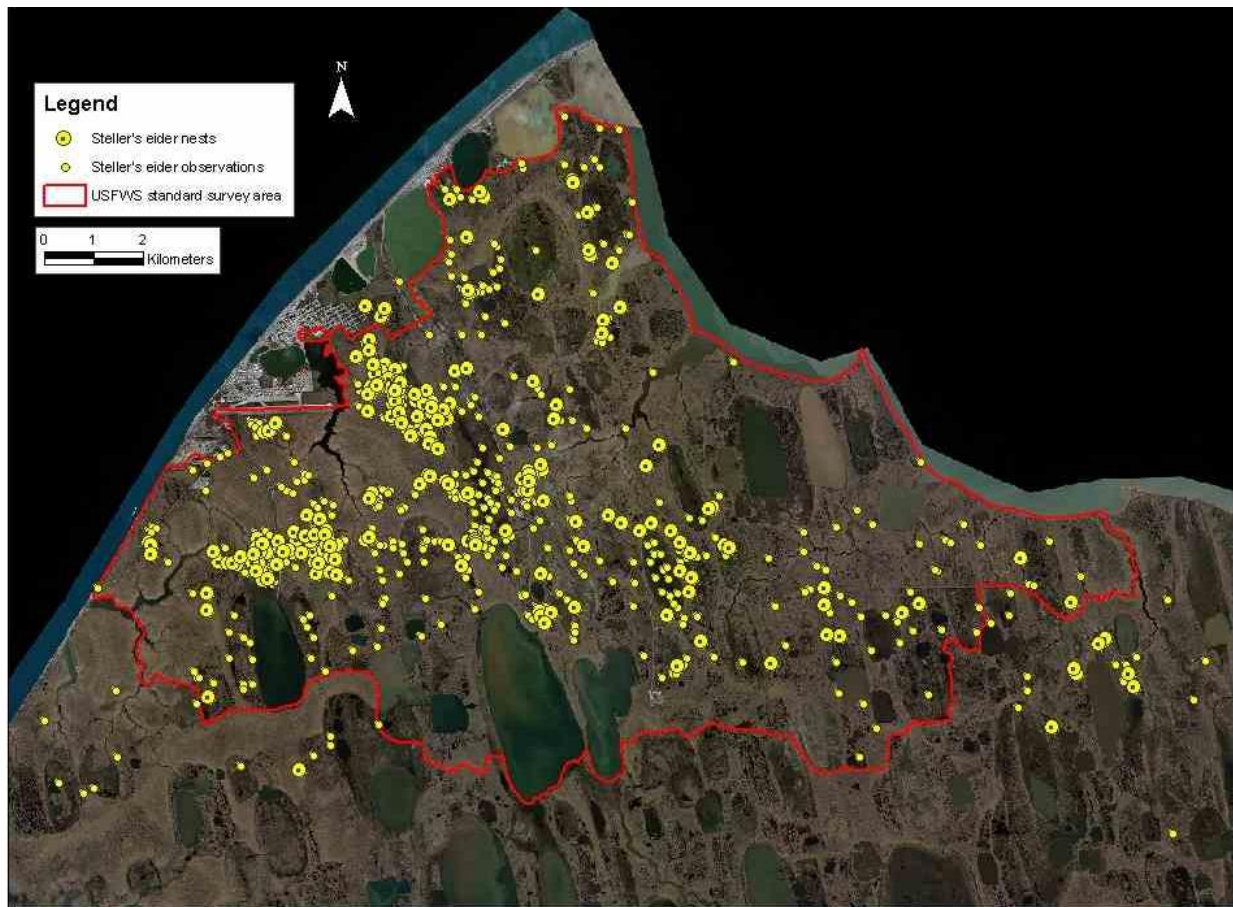


Figure 3.6. Steller's eider nest locations (1991–2010) and breeding pair observations (1999–2010). The standard survey area is surveyed annually. The survey area is expanded beyond the standard area in some years.

Use of Non-breeding Habitats

Departure from the breeding grounds differs by sex, breeding status, and nesting success; for example, female departure time depends on whether or not a female has nested and her success. Migration generally begins with most Steller's eiders near Barrow staging in areas such as Elson Lagoon, North Salt Lagoon, Imikpuk Lake, and the Chukchi Sea both north and south of Pigniq ("Duck Camp," Figure 3.7). For example, satellite telemetry data indicated at least 5 of 14 birds used Elson Lagoon (Martin et al. *in prep.*).

Males and non- or failed breeding Steller's eider females typically depart the breeding grounds before successfully nesting females. In late June and early July, male and female (non- or failed breeding) Steller's eiders dispersed across the area between Wainwright and Admiralty Inlet with most birds entering marine waters by the first week of July (Martin et al. *in prep.*). In years when nests were found near Barrow, flocks of males and non- or failed breeding female Steller's eiders were comprised of mostly males and persisted until about the second week of July (J. Bacon, North Slope Borough Department of Wildlife Management [NSBDWM], *pers. comm.*).

Later in the season adult females and juveniles will use the areas listed above. In a post-fledging and post-failure movements study of radio-marked nesting Steller's eider females in 2011 (N=10), most females reared their brood until fledging, one female failed to fledge young, and one female failed to hatch a nest (Safine 2012). For the females whose broods fledged, females and broods were first located post-fledging near their brood-rearing areas; later, most were found in nearby marine areas. Over half of the successful adult females were located subsequently in marine areas near Barrow, and the remaining females could not be located after leaving brood rearing areas (Safine 2012). From late August through early September when telemetry monitoring ceased, females and fledged juveniles were sighted on the Chukchi and Beaufort sea sides of the narrow spit extending to Point Barrow (Safine 2012). During this time, adult females and juveniles were also observed further south along the Chukchi Sea coast, near the City of Barrow (Safine 2012). One of the two failed females was also recorded in the same marine areas as the successful females and fledged juveniles (Safine 2012). A single failed nesting female equipped with a satellite transmitter in 2000 near Barrow remained near the breeding site until the end of July and stayed in the Beaufort Sea off Barrow until late August (Martin et al. *in prep*).

In years when nests are not found near Barrow, groups of Steller's eiders have been opportunistically sighted just off the shoreline of the Chukchi Sea from the gravel pits (southwest of the Barrow Airport) north to Pt. Barrow; they were absent earlier in the season and the sex ratios were more even compared to breeding years (J. Bacon, NSBDWM, *pers. comm.*).

The above information indicates coastal lagoons and nearshore waters of the Chukchi Sea near Barrow are important to adult and juvenile Steller's eiders.

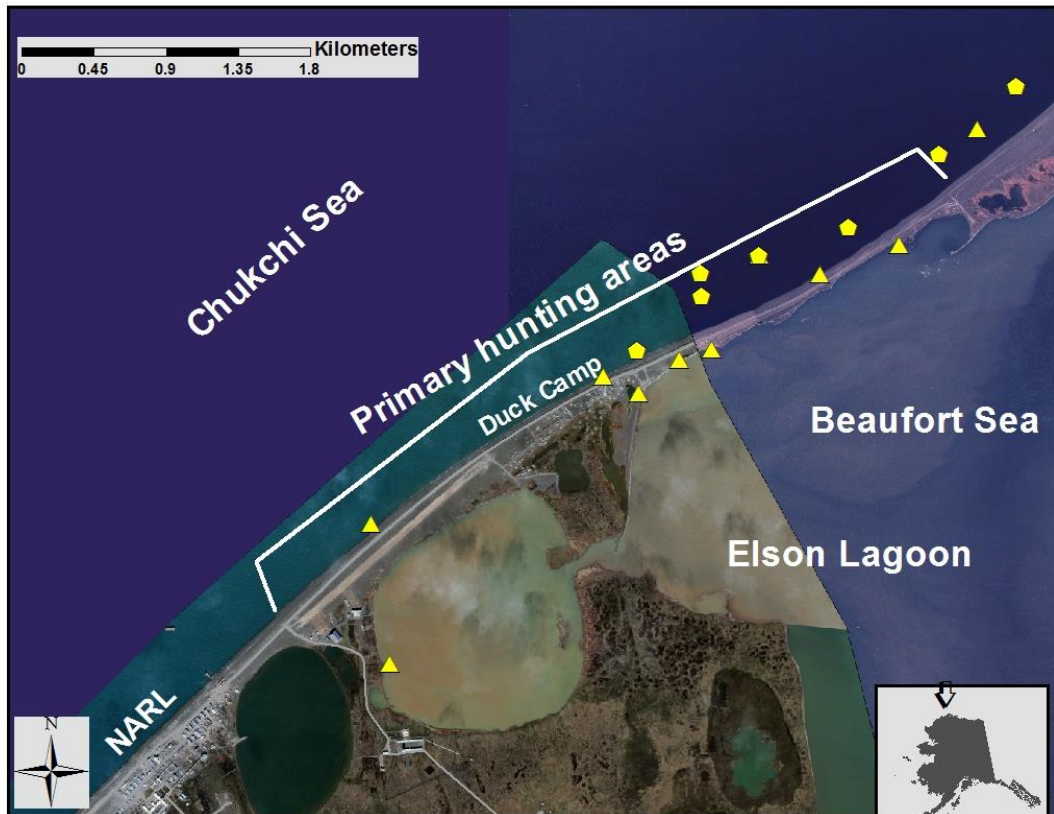


Figure 3.7. Marine locations of successful (triangles) and failed (pentagons) adult Steller's eiders (and juveniles) in the immediate vicinity of areas commonly used for subsistence hunting near Barrow, Alaska from mid-August to early September 2011.

Limited information on the migratory movements of Steller's eiders is available, particularly connecting breeding populations with migratory routes or specific molting or wintering areas. The best information available is from two satellite telemetry studies of Steller's eiders. One study marked Steller's eiders wintering on Kodiak Island, Alaska and followed birds through the subsequent spring (N=24) and fall (N=16) migrations from 2004 –2006 (D. Rosenberg, Alaska Department of Fish and Game [ADFG]). Most of the birds marked on Kodiak returned to eastern arctic Russia during the nesting period, and none of these birds (all presumed to be from the Russian breeding population) were relocated on land or the nearshore waters of Alaska north of the mouth of the Yukon River (ADFG, unpublished data). The second (but earlier) study marked birds (N=14) near Barrow, Alaska in 2000 and 2001 (Martin et al. *in prep.*). Birds from this study were relocated along arctic coast of Alaska southwest of Barrow to areas near Point Hope, on the Seward Peninsula, and in southern Norton Sound (Martin et al. *in prep.*). The birds marked near Barrow were also relocated further south in Alaska and in eastern arctic Russia in similar locations to birds marked in Kodiak. These studies did not delineate where the Russia and Alaska breeding populations merge and diverge during molt and spring migrations.

Molt and Winter Distribution

During post-breeding migration, Steller's eiders move towards molting areas in the nearshore

waters of Southwest Alaska where they undergo a complete flightless molt for about three weeks. The combined (Russian and Alaskan-breeding) Pacific population molts in numerous locations in Southwest Alaska, with exceptional concentrations in four areas along the north side of the Alaska Peninsula: Izembek Lagoon, Nelson Lagoon, Port Heiden, and Seal Islands (Gill et al. 1981, Petersen 1981, Metzner 1993). However, Kuskokwim Shoals, in northern Kuskokwim Bay, may also be an important molting location for Alaska-breeding Steller's eiders (Martin et al. *in prep*), especially considering the high molting site fidelity reported by Flint et al. (2000). Researchers also reported >2,000 eiders molting in lower Cook Inlet near the Douglas River Delta, and smaller numbers of molting Steller's eiders have been reported from around islands in the Bering Sea, along the coast of Bristol Bay, and in smaller lagoons along the Alaska Peninsula (e.g., Dick and Dick 1971, Petersen and Sigman 1977, Wilk et al. 1986, Dau 1987, and Petersen et al. 1991).

After molt, many of the Pacific-wintering Steller's eiders disperse to areas in the eastern Aleutian Islands, the south side of the Alaskan Peninsula, Kodiak Island, and as far east as Cook Inlet, although thousands may remain in lagoons used for molting unless or until freezing conditions force them to move (USFWS 2002). The USFWS estimates the Alaska-breeding population comprises only ~ 1% of the Pacific-wintering population of Steller's eiders. Wintering Steller's eiders usually occur in shallow waters (< 10 m deep), which are generally within 400 m of shore or at offshore shallows (USFWS 2002). However, Martin et al. (*in prep*) reported substantial use of habitats > 10 m deep during mid-winter. Use of these habitats by wintering Steller's eiders may be associated with night-time resting periods or with shifts in the availability of local food resources (Martin et al. *in prep*).

Northward Spring Migration

During spring migration thousands of Steller's eiders stage in estuaries along the north side of the Alaska Peninsula, including some molting lagoons, and at the Kuskokwim Shoals near the mouth of the Kuskokwim River in late May (Larned 2007, Martin et al. *in prep*). Like other eiders, Steller's eider may use spring leads for feeding and resting, but there is little information on habitat use during spring migration. Steller's eiders are thought to generally move along coastlines, although some cut across Bristol Bay (W. Larned, USFWS, *pers. comm.* 2000). Interestingly, despite many daytime aerial surveys, Steller's eiders have not been seen in migratory flights (W. Larned, USFWS, *pers. comm.* 2000b). Larned (1998) concluded that Steller's eiders show strong fidelity to "favored" sites during migration, where they congregate in large numbers to feed.

Recovery Criteria

The Steller's Eider Recovery Plan (USFWS 2002) presents research and management priorities, that are re-evaluated and adjusted every year, with the objective of recovery and delisting so that protection under the ESA is no longer required. When the Alaska-breeding population was listed as threatened, factors causing the decline were unknown, but possible causes identified were increased predation, shooting, ingestion of spent lead shot in wetlands, and habitat loss from development. Since listing, other potential threats have been identified, including exposure to

other contaminants, impacts from scientific research, and climate change but causes of decline and obstacles to recovery remain poorly understood.

Criteria used to determine when species are recovered are often based on historical abundance and distribution, or on the number needed to ensure the risk of extinction is tolerably low (with extinction risk estimated by population modeling). For Steller's eiders, information on historical abundance is lacking, and demographic parameters needed for accurate population modeling are poorly understood. Therefore, the Recovery Plan for Steller's eiders establishes interim recovery criteria based on extinction risk, with the assumption that numeric population goals will be developed as demographic parameters become better understood. Under the Recovery Plan, the Alaska-breeding population would be considered for reclassification to endangered if the population has $\geq 20\%$ probability of extinction in the next 100 years for 3 consecutive years, or the population has $\geq 20\%$ probability of extinction in the next 100 years and is decreasing in abundance. The Alaska-breeding population would be considered for delisting from threatened status if it has $\leq 1\%$ probability of extinction in the next 100 years, and each of the northern and western subpopulations are stable or increasing and have $\leq 10\%$ probability of extinction in 100 years.

Polar Bear

Status and Distribution

Due to threats to its sea ice habitat, on May 15, 2008 the Service listed the polar bear (*Ursus maritimus*) as threatened (73 FR 28212) throughout its range under the ESA. In the U.S., the polar bear is also protected under the MMPA and the Convention on International Trade in Endangered Species of Wildlife Fauna and Flora (CITES) of 1973.

Polar bears are widely distributed throughout the Arctic where the sea is ice-covered for large portions of the year (Figure 3.8). The number of polar bears is estimated to be 20,000-25,000 with 19 recognized management subpopulations or "stocks" (Obbard et al. 2010). The International Union for Conservation of Nature and Natural Resources, Species Survival Commission (IUCN/SSC) Polar Bear Specialist Group ranked 11, four, and three of these stocks as "data deficient," "reduced," and "not reduced," respectively (Obbard et al. 2010). The status designation of "data deficient" for 11 stocks indicates that the estimate of the worldwide polar bear population was made with known uncertainty.

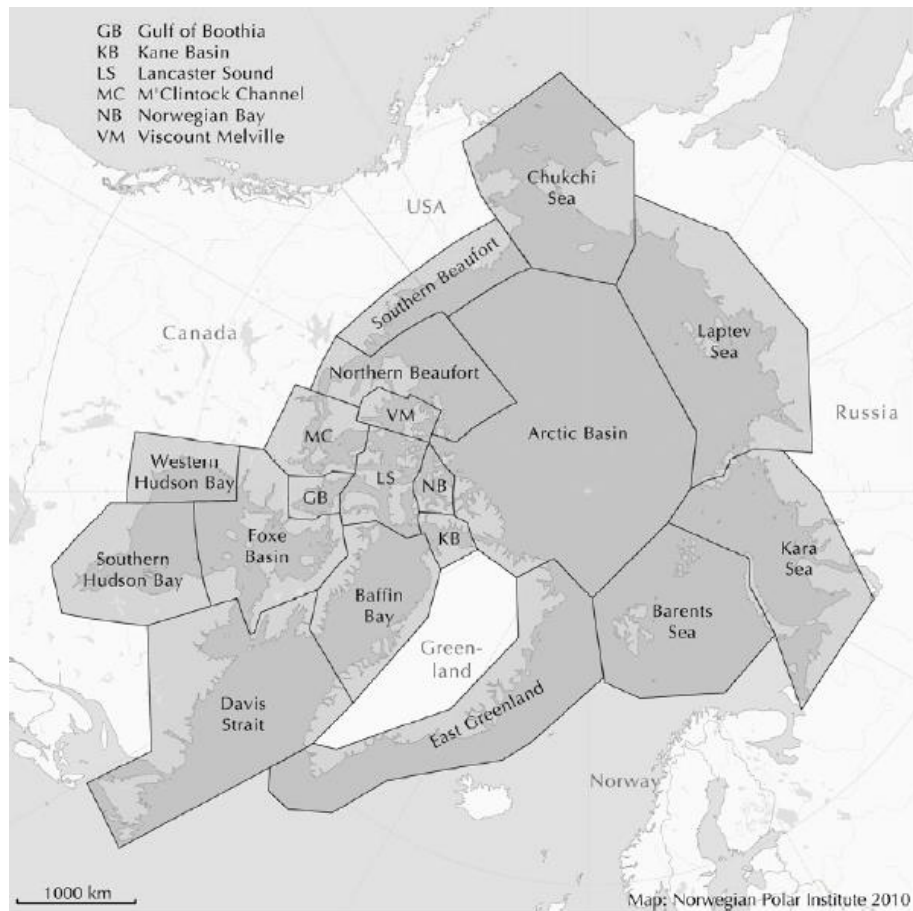


Figure 3.8. Distribution of polar bear stocks throughout the circumpolar basin (from Obbard et al. 2010).

Life History

For a complete life history of the polar bear, please see 73 FR 28212. We briefly describe the polar bear's food habits below.

Sea ice provides a platform for hunting and feeding, for seeking mates and breeding, for denning, for resting, and for long-distance movement. Ringed seals are polar bear's primary food source, and areas near ice edges, leads, or polynyas where ocean depth is minimal are the most productive hunting grounds (Durner et al. 2004). While polar bears primarily hunt seals for food, they may occasionally consume other marine mammals (73 FR 28212). While the main food source of polar bears is ice seals, bowhead whale carcasses have been available to polar bears as a food source on the North Slope since the early 1970s (Koski et al. 2005) and therefore may affect their distribution locally. Barter Island (near Kaktovik) has had the highest recorded concentration of polar bears on shore (17.0 ± 6.0 polar bears/100 km) followed by Barrow (2.2 ± 1.8) and Cross Island (2.0 ± 1.8 ; Schliebe et al. 2008). Record numbers of polar bears were observed in 2012 in the vicinity of the bowhead whale carcass "bonepile" on Barter Island; the USFWS observed a minimum, maximum, and average of 24, 80, and 52 bears respectively (USFWS 2012). The high number of bears on/near Barter Island compared to other areas is

thought to be due in part to the proximity to the ice edge and high ringed seal densities (Schliebe et al. 2008), the whale harvest at Kaktovik is lower than that at Barrow or Cross Island.

The use of whale carcasses as a food source likely varies among individuals and between years. Stable isotope analysis of polar bears in 2003 and 2004 suggested that bowhead whale carcasses comprised 11%-26% (95% CI) of the diets of sampled polar bears in 2003, and 0%-14% (95% CI) in 2004 (Bentzen et al. 2007). Polar bears depend on sea ice to hunt seals, and temporal and spatial availability of sea ice will likely decline. Thus, polar bear use of whale carcasses may increase in the future.

Threats to the Polar Bear

The arctic is losing sea ice, which will likely negatively affect polar bear populations. The loss rate of ice thickness is increasing (Haas et al. 2010), and trends in arctic sea ice extent and area (see http://nsidc.org/arcticseaicenews/faq/#area_extent for explanation of these terms) are negative (-12.2% and -13.5 %/decade, respectively; Comiso 2012). Summer declines in sea ice are more pronounced in summer than winter (NSIDC, 2011a, b). Positive feedback systems (i.e., sea-ice albedo) and naturally occurring events, such as warm water intrusion into the Arctic and changing atmospheric wind patterns, can cause fragmentation of sea ice, reduction in the extent and area of sea ice in all seasons, retraction of sea ice away from productive continental shelf areas throughout the polar basin, reduction of the amount of heavier and more stable multi-year ice, and declining thickness and quality of shore-fast ice (Parkinson et al. 1999, Rothrock et al. 1999, Comiso 2003, Fowler et al. 2004, Lindsay and Zhang 2005, Holland et al. 2006, Comiso 2006, Serreze et al. 2007, Stroeve et al. 2008). These climatic phenomena may affect seal abundances, the polar bear's main food source (Kingsley 1979, DeMaster et al. 1980, Amstrup et al. 1986, Stirling 2002).

Warming-induced habitat degradation and loss are negatively affecting some polar bear stocks, and unabated global warming could reduce the worldwide polar bear population (Obbard et al. 2010). Loss of sea ice habitat due to climate change is identified as the primary threat to polar bears (Schliebe et al. 2006, 73 FR 28212, Obbard et al. 2010). Patterns of increased temperatures, earlier spring thaw, later fall freeze-up, increased rain-on-snow events (which can cause dens to collapse), and potential reductions in snowfall are also occurring. However, threats to polar bears will likely occur at different rates and times across their range, and uncertainty regarding their prediction makes management difficult (Obbard et al. 2010).

Because the polar bear depends on sea ice for its survival, loss of sea ice due to climate change is its largest threat worldwide, although polar bear subpopulations face different combinations of human-induced threats (Obbard et al. 2010). Arctic summer sea ice reached its lowest average extent in 2012 and has declined 13% since 1979 (NSIDC). The largest human-caused loss of polar bears is from subsistence hunting of the species, but for most subpopulations where subsistence hunting of polar bears occurs, it is a regulated and/or monitored activity (Obbard et al. 2010). Other threats include accumulation of persistent organic pollutants in polar bear tissue, tourism, human-bear conflict, and increased development in the Arctic (Obbard et al. 2010). Because uncertainty exists regarding the numbers of bears in some stocks and how human activities interact to ultimately affect the worldwide polar bear population, conservation and management of polar bears at the worldwide population level is challenging.

Polar bear critical habitat

The Service designated polar bear critical habitat on November 24, 2010 (75 FR 76086). On October 29, 2009, the Service proposed critical habitat for polar bears (74 FR56058). A final rule designating three critical habitat units for polar bears was issued on December 7, 2010 (75 FR 76086). These units were identified as (1) Sea-ice Habitat; (2); Terrestrial Denning Habitat; and (3) Barrier Island Habitat. On January 11, 2013, the U.S. District Court for the District of Alaska issued a decision vacating and remanding the final rule to the Service in *Alaska Oil and Gas Association et al. v. Salazar et al* (D. Alaska)(3:11-cv-00025-RRB). Decisions regarding the District Court's order are currently pending, and the scope and description of a final critical habitat designation for polar bears are unresolved. For advisory purposes, we analyze effects to proposed critical habitat in this BO. We note this analysis may ultimately need to be revised and consultation reinitiated to reflect any changes made in a final critical habitat designation.

The Primary Constituent Elements (PCEs) of proposed critical habitat for the polar bear are:

- 1) **Sea-ice habitat** used for feeding, breeding, denning, and movements, which is sea ice over waters 300 m (984.2 ft) or less in depth that occurs over the continental shelf with adequate prey resources (primarily ringed and bearded seals) to support polar bears.
- 2) **Terrestrial denning habitat**, which includes topographic features, such as coastal bluffs and river banks, with the following suitable macrohabitat characteristics:
 - a) Steep, stable slopes (range 15.5–50.0), with heights ranging from 1.3 to 34 m (4.3 to 111.6 ft), and with water or relatively level ground below the slope and relatively flat terrain above the slope;
 - b) Unobstructed access between den sites and the coast;
 - c) Sea ice in proximity to terrestrial denning habitat prior to the onset of denning during the fall to provide access to terrestrial den sites; and
- 3) **Barrier island habitat** used for denning and movements along the coast to access maternal den and optimal feeding habitat, which includes all barrier islands along the Alaska coast and their associated spits, within the range of the polar bear in the United States, and the water, ice, and terrestrial habitat within 1.6 km (1 mi) of these islands (no-disturbance zone).

4. ENVIRONMENTAL BASELINE

The environmental baseline provides an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, their habitat, and ecosystem in the action area.

Other activities occurring in the action area

Since the 2010 Summer Programmatic BO (USFWS 2010) was finalized, the following additional formal consultations are active or are in preparation in the action area:

- BO for Bureau of Land Management for the NPR-A (USFWS 2008);
- The Service's Migratory Bird Management BO for issuance of 2013 subsistence harvest regulations (USFWS 2013a);

- Section 10 recovery permit for USGS research on spectacled eider habitat use in 2011;
- Shell Inc. near-shore and terrestrial NPR-A environmental baseline research in 2012;
- Proposed planning area documents and permits issued by the Corps, and the EPA for Industry-related development, including CD-5;
- Oil and gas lease offerings within the NPR-A Planning Areas managed by the BLM;
- Integrated Activity Plan for the NPR-A (USFWS 2013b);
- NPR-A permits for on-shore winter travel for non-oil and gas activities for the next five years; and
- Non-federal activities such as snow machine and recreation in the Action Area.

The effects of these activities on listed species were considered in our final jeopardy analysis. BOs for polar bears were not considered because we did not anticipate take of polar bears in this proposed action.

Spectacled and Steller's eiders

Spectacled and Steller's eiders can occur in the project area between May and September, though they occur at low densities and Steller's eiders are particularly rare.

Polar bears

Polar bears can occur in the action area. Polar bears generally do not occur inland during the summer, but field crews could encounter occasional transient polar bears when working near the coast. Polar bears can be found with a higher frequency during summer and fall on barrier islands and along the mainland coast.

Polar bear critical habitat

Many of the activities take place within the area likely to be proposed for polar bear critical habitat. The action area also contains existing structures that would be excluded from critical habitat.

5. EFFECTS OF THE ACTION ON LISTED SPECIES

This section of the BO provides an analysis of effects of the action on listed species and critical habitat. Both direct effects (i.e., those immediately attributable to the action) and indirect effects (i.e., those caused by the action but which will occur later in time) are considered, as well as interrelated and interdependent effects of the Action.

Spectacled and Steller's eiders

Similar to work authorized under the previous programmatic BOs, the proposed activities may result in disturbance of nesting females and broods. Spectacled eiders are more likely to be disturbed than Steller's eiders because spectacled eiders are more abundant on the ACP than Steller's eiders.

Aircraft landings and on-tundra activities

Given an absence of empirical data, it is difficult to estimate the effect of aircraft landings upon nesting eiders. Therefore, our estimates are based on a series of assumptions. We assume a gradient of effect centered on the landing site. A landing close to a nest would likely flush a female and prevent her from returning for as long as the aircraft, and associated human activity, remain near the nest. The likelihood of a hen flushing and her reluctance to return to the nest likely decreases as distance from the landing site increases. For the purposes of calculating incidental take we assumed that all hens within a 600 m radius of a landing site will be flushed, and their nests will subsequently be at increased risk of abandonment or depredation.

After landing, field crews will conduct work over an unspecified area. Some studies involve searching a plot, and it is assumed that all nesting eiders on the plot would be disturbed. Other work will be conducted along transects, potentially disturbing birds over a narrower linear area. Based on activity descriptions provided by BLM we do not anticipate these on-tundra activities would disturb birds in an area larger than that impacted by the landing. Therefore, disturbance from landings and on-tundra activities at study locations has been combined for the purposes of estimating incidental take.

BLM estimates that aircraft landings and on-tundra activities will occur at 1,700 sites during the eider nesting season (between June 5 and August 15) in 2013. The number of aircraft landings at each site varies from one to several throughout the season, and duration of activities at each site varies from < 1 hour to 8-10 hours.

The estimated average density of listed eiders within the North Slope Eider Strata of the ACP Survey in 2010 was 0.1157 spectacled eiders/km² (Larned et al. 2011); and hence we assume 0.058 nests/ km². No Steller's eiders were detected in the 2010 survey, however, 2009 survey data indicate 0.002 Steller's eiders/km² or 0.001 nests/ km² within the North Slope Eider Strata (Larned et al. 2010). These average densities were used to estimate incidental take, as described below.

The number of hens that may be flushed in a radius 600 m from a landing site was calculated multiplying the area (1.13 km²) by the number of estimated sites in 2013, and the average nest density for each species, resulting in an estimate of 111 spectacled eider and 2 Steller's eider flush events as follows:

$$1,700 \text{ (320 fixed wing + 1,150 helicopter landings without tracks + 230 with tracks) sites} \\ \times 1.13 \text{ km}^2 = 1,921 \text{ km}^2 \text{ affected}$$

$$0.058 \text{ spectacled eider nests/km}^2 \times 1,921 \text{ km}^2 = 111.41 \text{ spectacled eider flush events}$$

$$0.001 \text{ Steller's eider nests/km}^2 \times 1,921 \text{ km}^2 = 1.92 \text{ Steller's eider nest flush events}$$

Not all nests from which the female is flushed will be abandoned or depredated. The likelihood of nest abandonment or depredation resulting from aircraft landings and on-tundra activities probably varies among sites based on the number of aircraft landings during the nesting season and the intensity and duration of activities at each site. For example, a site visit that includes one helicopter landing of 15 minutes may result in a lower likelihood of nest abandonment than a site

visit requiring several landings and 8-10 hours of on-tundra activity; however, the difference is difficult to quantify. Data from the Y-K Delta indicates that disturbance from human activity results in decreases in spectacled eider nest survival rate of 4% (Bowman and Stehn 2003), and 14% (Grand and Flint 1997). For the purposes of estimating effects, we estimate that on average 9% (mean of 4 and 14%) of flushes will result in nest loss. Hence, the estimated 111.41 flush events will result in the loss of **10 spectacled eider nests** ($111.41 \times 0.09 = 10.02$), and 1.92 flush events will result in the loss of **< 1 Steller's eider nest** ($1.92 \times 0.09 = 0.17$).

Ground activities at field camps and fuel depots

Based on supplemental information provided by BLM, 57 remote camps and 1 fuel depot will be operating in undeveloped areas of NPR-A in summer and fall 2013. Each field camp will not have the same effect on nesting eiders; camps vary in size, number of field staff, duration, and number of aircraft landings required, therefore some camps may be more likely to cause nest abandonment than others. However, the extent of disturbance resulting from activities at these camps is difficult to quantify. Therefore, as in other consultations, we assume on-going activities and repeated aircraft landings at camp sites will repeatedly disturb all nests in a 600 m radius (1.13 km^2) from the camp, such that nests in this area will fail.

Using these methods, we estimate approximately 65.54 km^2 will be disturbed by field camps or fuel sites in 2013 ($58 \times 1.13 \text{ km}^2 = 65.54 \text{ km}^2$), and we consider nest failure likely within this area.

To estimate the number of nests that may fail due to disturbance, we multiplied the affected area (65.54 km^2) by the estimated density of eiders in that area. In the previous programmatic BOs we used spectacled eider densities derived from GIS kernel analysis of data collected during annual North Slope breeding population aerial surveys from 1993 – 2005 (Service data, unpublished). However, the location of some field sites are based on particular study objectives (i.e., presence of the study species or site characteristics), therefore exact site locations are unknown for some 2013 activities at the time of consultation. Because of the uncertainty of camp locations, we believe it is more appropriate to use the average density of listed eiders across the North Slope calculated from the most recent aerial eider survey (0.1157 spectacled eiders (Larned et al. 2011) and 0.002 Steller's eiders/ km^2 , Larned et al. 2010).

Using these methods, the estimated number of nests potentially disturbed was calculated as follows:

$0.1157 \text{ spectacled eiders}/\text{km}^2 \times 65.54 \text{ km}^2 = 7.6 \text{ spectacled eiders} \div 2 = 3.8 \text{ spectacled eider nests}$

$0.002 \text{ Steller's eiders}/\text{km}^2 \times 65.54 \text{ km}^2 = 0.131 \text{ Steller's eiders} \div 2 = 0.065 \text{ Steller's eider nests}$

Using these data and the assumption that all nests within 600 m of the camps will fail, we estimate the camps and their associated activities may result in the loss of **< 4 spectacled eider nests and < 1 Steller's eider nest**.

Loss of eggs is of much lower significance for survival and recovery of the species than the death of an adult bird. For example, when nest success, fledging success, over-winter survival, and annual survival are taken in context, we estimate roughly 1-7 out of every 100 spectacled eiders hatched on the Y-K Delta would enter the breeding population (Grand and Flint 1997, Flint et al. 2000, Grand et al. 1998, and Flint pers. comm.). Similarly, we would expect only a small proportion of spectacled eider eggs or ducklings hatched on the North Slope to achieve reproductive potential.

Based on an average clutch size of 3.9 eggs for spectacled eiders (Petersen et al. 2000, Bart and Earnst 2005, Johnson et al. 2008), we estimate up to 55 eggs could be lost due to nest abandonment.

$$3.9 \text{ eggs} \times 14 \text{ nests (10 from landings + 4 from camps)} = 54.6 \text{ eggs lost}$$

Because the most recent population estimate for North Slope-breeding spectacled eiders is 11,254 (8,338–14,167, 95% CI), and recruitment into the breeding population is very low, we would not anticipate population level effects from the loss of 55 eggs from 14 abandoned nests as a result of aircraft landings and on-tundra activities.

Polar bears

Polar bears occasionally use the coastal margins of NPR-A in summer and fall, but encounters are anticipated to be infrequent and affect few individuals, particularly for activities occurring inland. If field crews in transit via aircraft encounter polar bears, aircraft noise may cause minor behavioral changes in polar bears (e.g., may run a short distance). However, to minimize effects if field crews detect a polar bear, per the human – polar bear guidelines, they will divert their flight path to a minimum of 2,000 feet above ground level or ½ mile horizontal distance from the observed bear(s) whenever possible. There is also a slight possibility that field crews on the ground may encounter transient polar bears during the proposed action. However, any disturbance by humans on the ground would likely cause only minor and temporary behavioral changes, especially because field crews will follow a human-polar bear interaction plan. Because the chance of encountering a polar bear is low and if one is encountered affects will be minor, project effects are discountable and insignificant on polar bears.

Polar bear critical habitat

Several projects would take place within proposed polar bear critical habitat. These projects would either not alter physical features of critical habitat important to the conservation role of polar bears, or the alterations will be extremely limited in nature (e.g., temporary tracks from aircraft on tundra). Therefore, effects of the proposed projects are expected to be insignificant to proposed polar bear critical habitat.

6. CUMULATIVE EFFECTS

Under the Act, cumulative effects are the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the Action Area considered in this BO. Future Federal

actions that are unrelated to the proposed action are not considered because they require separate consultation under the Act.

The possibility exists that some private citizens may disturb listed species as they travel in the area while hunting, camping, etc. Most of the action area is remote, and these effects would be very low.

7. CONCLUSIONS

After reviewing the current status of spectacled eiders, Alaska-breeding Steller's eiders, polar bears, the environmental baseline, effects of the proposed activities, and cumulative effects, it is the Service's biological opinion that the activities to be permitted or conducted by BLM from June 5 – October 15, 2013 described in this BO are not likely to jeopardize the continued existence of listed species. In evaluating the impacts of the proposed project to spectacled and Steller's eiders, the Service concludes that direct effects could result through disturbance of nesting females from proposed activities.

- The population of North Slope-breeding spectacled eiders is estimated at 12,916 (10,942-14,890 95% CI; Stehn et al. 2006); therefore, the estimated loss of 55 eggs is not expected to have appreciable population level effects. The Service believes this level of incidental take will not significantly affect the likelihood of survival and recovery of spectacled eiders.
- No lethal incidental take of Steller's eiders is anticipated.

After reviewing the current status and environmental baseline of proposed polar bear critical habitat, and the effects of the proposed activities and cumulative effects, it is the Service's biological opinion that the activities to be permitted or conducted by BLM from June 5 – October 15, 2013 described in this BO are not likely to adversely affect proposed polar bear critical habitat.

- Effects to proposed critical habitat would not persist, would have at most an insignificant effect on the function of PCEs, and are unlikely to affect the intended conservation role for polar bears.

8. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, but not the purpose of, carrying out of an otherwise lawful activity. Under the terms of section

7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement (ITS).

As described in *Effects of the Action*, the activities described and assessed in this BO may adversely affect spectacled and Steller's eiders through disturbance from aircraft landing, people working on the tundra, and activities at field camps. We anticipate the following take for **spectacled eiders**:

- 111 flush events
- Loss of production of 14 abandoned nests with eggs

Although up to two **Steller's eider** females may be flushed off their nests, no lethal take of Steller's eiders is anticipated.

The measures described below are non-discretionary, and must be undertaken by the BLM so that they become binding conditions of any grant or permit issued to an applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The BLM has a continuing duty to regulate activities covered by this incidental take statement. If the BLM (1) fails to assume and implement the terms and conditions, or (2) fails to require any applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse.

9. REASONABLE AND PRUDENT MEASURES

These reasonable and prudent measures (RPMs) and their implementing terms and conditions aim to minimize the incidental take anticipated from activities described in this BO. As described in Section 8 – Incidental Take Statement, activities conducted or authorized by BLM are anticipated to lead to incidental take of spectacled eiders through disturbance of nesting or brood rearing females.

RPM A - To ensure all effects of proposed activities have been considered, prior to authorizing or conducting activities, BLM must provide the Service with project descriptions.

RPM B - To monitor implementation of this programmatic BO and evaluate its effectiveness both in terms of protecting the species and improving administrative efficiency, BLM and their agents are required to record and report the location, time, and date of all aircraft landings.

10. TERMS AND CONDITIONS

To be exempt from the prohibitions of Section 9 of the Act, BLM and their agents must comply with the following terms and conditions, which implement the RPMs described above. These terms and conditions are non-discretionary.

RPM A - To ensure all effects of proposed activities have been considered, prior to conducting or authorizing activities, BLM must contact the Service providing project descriptions.

Prior to conducting or authorizing a project, BLM will contact the Service with a description of proposed activities. The Service will review this information to ensure the activities are within the scope of this programmatic BO.

RPM B - To monitor implementation of this programmatic BO and evaluate its effectiveness both in terms of protecting the species and improving administrative efficiency, BLM and their agents are required to record and report the location, time, and date of all aircraft landings.

BLM is required to report the location (latitude and longitude) of all helicopter landings in undeveloped areas of NPR-A for activities authorized by this BO. The date and time of landing and take-off should be described. Data should be provided in decimal degree form, in Microsoft ExcelTM spreadsheets, with the latitude and longitude in separate columns. These data should be provided to the Service by November 30, 2013, where it will be used to:

- Assist in determining if the programmatic consultation adequately assessed effects (e.g., if activities are concentrated in specific areas then a more region specific density estimate may have been appropriate); and
- Determine if the number and types of activities that actually occurred was accurately estimated and help evaluate the benefit of a programmatic approach for BLM and the Service in terms of work load and responsiveness to applicants.

11. CONSERVATION RECOMENDATIONS

Section 7(a)(1) of the ESA directs federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

BLM is encouraged to:

- Schedule compliance inspections, surveys, and other work to avoid the nesting period, especially in areas of NPR-A known to support high densities of listed eiders;
- Communicate with applicants, and request they consider planning future work such that high use areas and/or the nesting period are avoided;
- Continue to support research that may provide information to strengthen our understanding of Steller's and spectacled eiders, the reasons for their decline, and assist in focusing and conducting recovery efforts; and
- Facilitate coordination of field efforts to reduce duplication of trips and efforts in the same areas.

In order for the Service to be kept informed of actions affecting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

12. REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the BLM's letter requesting consultation and supplemental materials pertaining to aircraft landings, on-tundra activities in remote areas, and field camps/fuel depots in undeveloped portions of NPR-A June 5 to October 15, 2013.

As provided in 50 CFR 402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if:

- 1) The amount or extent of incidental take is exceeded;
- 2) New information reveals effects of the action agency that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion;
- 3) The agency action is subsequently modified in a manner that causes an effect to listed or critical habitat not considered in this opinion; or
- 4) A new species is listed or critical habitat is designated that may be affected by the action.

Thank you for your cooperation in the development of this biological opinion. If you have any comments or require additional information, please contact Ted Swem, Endangered Species Branch Chief, Fairbanks Fish and Wildlife Field Office, 101 12th Ave., Fairbanks, Alaska, 99701.

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14. APPENDIX 1: POLAR BEAR INTERACTION GUIDELINES

These Polar Bear Interaction Guidelines (Guidelines) were developed to ensure that activities are conducted in a manner that avoids conflicts between humans and polar bears. Polar bears are protected under the Marine Mammal Protection Act (MMPA), and were listed as a threatened species under the Endangered Species Act (ESA) in 2008. The MMPA and ESA both prohibit the “take” of polar bears without authorization. Take includes disturbance/harassment, as well as physical injury and killing of individuals.

In addition to sea ice, polar bears use marine waters and lands in northern Alaska for resting, feeding, denning, and seasonal movements. They are most likely to be encountered within 25 miles of the coastline, especially along barrier islands during July-October. Polar bears may also be encountered farther inland, especially females during the denning period (October-April). Polar bears may react differently to noise and human presence. The general methods for minimizing human-bear conflicts are to: 1) avoid detection and close encounters; 2) minimize attractants; and 3) recognize and respond appropriately to polar bear behaviors. These Guidelines provide information for avoiding conflicts with polar bears during air, land, or water-based activities.

Unusual sightings or questions/concerns can be referred to: Susanne Miller or Craig Perham, Marine Mammals Management Office (MMM Office), 1-800-362-5148; or to Sarah Conn (907) 456-0499 of the Fairbanks Fish & Wildlife Field Office (FFWFO).

When operating aircraft:

- If a polar bear(s) is encountered, divert flight path to a minimum of 2,000 feet above ground level or ½ mile horizontal distance away from observed bear(s) whenever possible.

When traveling on land or water:

- Avoid surprising a bear. Be vigilant—especially on barrier islands, in river drainages, along bluff habitat, near whale or other marine mammal carcasses, or in the vicinity of fresh tracks.
- Between October and April special care is needed to avoid disturbance of denning bears. If activities are to take place in that time period the MMM Office should be contacted to determine if any additional mitigation is required. In general, activities are not permitted within one mile of known den sites.
- Avoid carrying bear attractants (such as strongly scented snacks, fish, meat, or dog food) while away from camp; if you must carry attractants away from camp, store foods in air-tight containers or bags to minimize odor transmission until you return them to “bear-resistant” containers.*

- If a polar bear(s) is encountered, remain calm and avoid making sudden movements. Stay downwind if possible to avoid allowing the bear to smell you. Do not approach polar bears. Allow bears to continue what they were doing before you encountered them. Slowly leave the vicinity if you see signs that you've been detected. Be aware that safe viewing distances will vary with each bear and individual situation. Remember that the closer you are to the animal, the more likely you are to disturb it.
- If a bear detects you, observe its behavior and react appropriately. Polar bears that stop what they are doing to turn their head or sniff the air in your direction have likely become aware of your presence. These animals may exhibit various behaviors:
 - *Curious* polar bears typically move slowly, stopping frequently to sniff the air, moving their heads around to catch a scent, or holding their heads high with ears forward. They may also stand up.
 - *A threatened or agitated* polar bear may huff, snap its jaws together, stare at you (or the object of threat) and lower its head to below shoulder level, pressing its ears back and swaying from side to side. These are signals for you to begin immediate withdrawal by backing away from the bear. If this behavior is ignored, the polar bear may charge. Threatened animals may also retreat.
 - In rare instances you may encounter a *predatory* bear. It may sneak or crawl up on an object it considers prey. It may also approach in a straight line at constant speed without exhibiting curious or threatened behavior. This behavior suggests the bear is about to attack. Standing your ground, grouping together, shouting, and waving your hands may halt the bear's approach.
- If a polar bear approaches and you are in the bear's path—or between a mother and her cubs—get out of the way (without running). If the animal continues to approach, stand your ground. Gather people together in a group and/or hold a jacket over your head to look bigger. Shout or make noise to discourage the approach.
- If a single polar bear attacks, defend yourself by using any deterrents available. If the attack is by a surprised female defending her cubs, remove yourself as a threat to the cubs.

When camping:

- Avoid camping or lingering in bear high-use areas such as river drainages, coastal bluffs and barrier islands.
- Store food and other attractants in "bear-resistant" containers*. Consider the use of an electric fence as additional protection. Do not allow the bear to receive food as a reward in your camp. A food-rewarded bear is likely to become a problem bear for you or someone else in the future.

- Maintain a clean camp. Plan carefully to: minimize excess food; fly unnecessary attractants out on a regular basis (i.e. garbage, animal carcasses, excess anti-freeze or petroleum products); locate latrines at least ¼ mile from camp; and wash kitchen equipment after every use.
- If a polar bear approaches you in camp, defend your space by gathering people into a large group, making noise and waving jackets or tarps. Continue to discourage the bear until it moves off. Have people watch the surrounding area in case it returns later, keeping in mind that polar bears are known to be more active at night. Additional measures to protect your camp, such as electric fences or motion sensors can be used.

Harassment of polar bears is not permissible, unless such taking (as defined under the MMPA) is imminently necessary in defense of life, and such taking is reported to FWS within 48 hours.

*Containers must be approved and certified by the Interagency Grizzly Bear Committee as "bear-resistant." Information about certified containers can be found at <http://www.igbconline.org/html/container.html>.

FOR DEPARTMENT OF INTERIOR EMPLOYEES ONLY

Use of Deterrents

In addition to following the Guidelines above, all U.S. Fish and Wildlife Service (Service) employees must have completed the Department of the Interior's (DOI) Bear and Firearm Safety Training course and be current in certification before engaging in field activities. Service staff must practice with and know how to use deterrents prior to conducting field work. If working in bear habitat, Service staff must anticipate and plan for possible scenarios of encountering polar bears, and identify appropriate responses, prior to initiating field work. Use of non-lethal polar bear deterrents by Service staff is only permissible if it is done in a humane manner and is for the purposes of protection or welfare of the bear or the public. Service staff has the right to use lethal methods to protect the public from polar bears in defense of life situations, and may do so when all reasonable steps to avoid killing the bear(s) have been taken.

Notification of Use of Deterrents

The Department of the Interior Bear Incident Report Form will be used to record and report polar human-polar bear interactions *that require use of deterrents*. These incidents will be reported to the MMM Office. This information will be used to track interactions over time and improve polar bear conservation and management.